PRENATAL BLOOD TESTS and CONGENITAL SYPHILIS*

GEORGE M. UHL, M. D.
AND
R. L. KAUFMAN, M. D.
Los Angeles

THE prenatal blood test law became effective in California on September 19, 1939. This made California the fourth State to pass such legislation for control and eradication of congenital syphilis.

On theoretical grounds, the effective enforcement of such a public health procedure should materially reduce newborn congenital syphilis and eventually stamp it out. With a view to partially evaluating this law, the present survey was undertaken. The procedure was as follows:

All congenital syphilis reports to the Los Angeles City Health Department in births occurring subsequent to the passage of the prenatal blood test law were collected. A questionnaire was prepared and personal contact made with each mother to gather certain facts.

CLINICAL MATERIAL

The study covers congenital syphilis cases whose births occurred between February 6, 1940 and March 10, 1944. Only 30 proven and completed cases could be written up for this period, although more were reported. In some instances, the whereabouts of the mother or father could not be obtained. In general, the coöperation of mothers interviewed was good, and their answers dependable.

Statistical tables condensing the information from which conclusions have been drawn are submitted.

TABLE 1.[1]—*Racial Distribution of Total Births in Los Angeles City, and 30 Congenital Syphilis Births*

Race	Total Births	Congenital Syphilis Births
White	89,061	7
Mexican	13,376	8
Colored	5,692	14
Unknown	....	1
	108,129	30 Cases

Table 1 shows that the proportion of congenital syphilis births among Mexicans and Negroes is much higher than among the white population. According to the November, 1944, *Monthly Report of the Bureau of Venereal Diseases* of the California State Health Department "an alarming increase of over 50 per cent congenital syphilis cases among the Negroes" has occurred. Table 2 supports this inference.

The State Health Department figures also show a marked decrease in reported congenital syphilis cases in the under one and the one to four year age groups. This occurred in spite of a war time increase of 54.8 per cent in the number of births from 1940 to 1943.

TABLE 3.[2]—*Number of Cases of Congenital Syphilis Reported in California by Age Groups 1940-1943*

Births	Year	Age Less Than One Year No.	%	Age One to Four Years No.	%
111,000	1940	136	.12%	77	.06%
125,000	1941	93	.07	59	.04
153,000	1942	74	.04	53	.03
173,000	1943	74	.04	63	.03
562,000		377	.06	252	.04

The State Report (Table 3) shows a 50 per cent decrease in the per cent of congenital syphilis cases in the under one year age group and a 24.7 per cent decrease in the one to four age group, "indicating that since the law was in effect many more pregnant women with syphilis are being treated."[2]

TABLE 4.[1]—*Age of Mother at Time Baby Born*

Ages	Number
15 through 17	3
18 through 20	6
21 through 23	10
24 through 26	6
27 through 29	2
30 through 35	0
36 through 38	1
Age 41	1
Unknown	1
TOTAL	30 Cases

In Table 4 it is seen that almost two-thirds of the births occurred to mothers under the age of 24 years.

TABLE 5.—*Time Interval Woman Considered Herself Pregnant Before She Went to Doctor*

Months Pregnant	Number
Less than 1 month	8
1 to 2 months	2
2 to 3 months	2
3 to 4 months	3
4 to 5 months	3
5 to 6 months	1
6 to 7 months	3
7 to 8 months	2
Over 8 months	1
At time of labor	3
Unknown	2
TOTAL	30 Cases

Table 5 shows that 50 per cent of the expectant mothers went to a physician before the fourth month of pregnancy, a time when prompt treatment of diagnosed syphilis could, in most cases, result in the birth of a nonluetic child.

TABLE 6.—*Time at which Blood was Taken for Test*

First visit	17
Second visit	1
2 months after first visit	2
Not taken	10
TOTAL	30 Cases

TABLE 2.[2]—*Number and Per Cent of Cases of Congenital Syphilis Reported in California by Race, 1940-1943*

Race	1940	1941	1942	1943	Per Cent 1940	1941	1942	1943
White	318	458	413	567	35.1	55.3	57.5	57.2
Negro	83	95	107	203	9.2	11.4	14.9	20.5
Mexican	155	180	142	177	17.1	21.7	19.7	17.9
Other	34	56	36	18	3.8	6.7	5.0	1.8
Unknown	315	41	21	26	34.8	4.9	2.9	2.6
Total	905	830	719	991	100.0	100.0	100.0	100.0

* From the offices of the Health Officer and Epidemiologist of the City of Los Angeles.

Acknowledgment.—The authors are indebted to H. C. Pulley, M.D., Chief Assistant Health Officer, for his constructive criticism and timely suggestions.

Seventeen of the thirty luetic mothers had a blood test at the first visit to the doctor. It is unfortunate that one-third of the thirty had no blood test during pregnancy. These two tables show that half the mothers went to a doctor before the fourth month and over half had a blood test at the first visit.

TABLE 7.—*Interval from Time of Blood Test to Beginning of Treatment*

As soon as report back	9
At time of chancre (early tests negative)	1
One month	1
Two months (early tests negative)	1
Not notified of result—no treatment	4
Told it was negative—no treatment	3
Unknown	1
No blood test in pregnancy	10
TOTAL	30 Cases

COMMENT

In four instances, blood tests were made but the patients were not notified of the result, and hence no treatment was given during pregnancy. Table 7.

In one patient blood was taken by a private doctor at the first visit, two months after the woman considered herself pregnant. This visit was in July, 1943. She did not return to her original doctor, but went to one of the Los Angeles City Health Department clinics where five consecutive blood tests were negative and the sixth was positive. Treatment was started two weeks after the last test, on September 23, 1943. Prior to her baby's birth on January 18, 1944, she had twelve bismuth and seven arsenical injections.

In another patient a blood test performed in the third month of pregnancy was negative. In December, 1940 (about the eighth month) the woman presented herself at the Los Angeles City Maternity Clinic with a vulval lesion which was darkfield positive. Blood test at this time was also negative. Only three arsenical and bismuth injections could be given before the birth of a luetic baby on January 6, 1941. This same patient had three other children, the first two born prior to the birth of the luetic child and one following. Two children, ages 6 and 4, were both found to be negative by examination and blood test. The third child, born February 21, 1942, or more than 13 months following the birth of the luetic child also has congenital syphilis. The reason the mother gave for her failure to take regular treatments was that she had no funds for carfare to attend the clinic. This case demonstrates the births of two consecutive congenital luetic children to one mother, the first closely following a primary lesion in the mother; the second due to inadequate maternal anti-luetic therapy in the thirteen months interval between the births.

The mother of one congenital luetic child, which was born on February 8, 1944, had two other children, age 3 and 2, both well. Her husband entered the Army in December, 1942, and was stationed in another city. In February, 1943, she had a blood test for a defense job which was negative. On March 6, 1943, she visited her husband in training. On April 25, 1943, she had another blood test and was told it was positive. She took four "arm treatments," then left for another city without her husband, but did not resume treatment there until October, 1943. She arrived in Los Angeles in January, 1944, after taking a total of sixteen arm injections. No further treatments were taken before the baby's birth on February 8, 1944. The child was luetic.

Six congenital luetic children of the thirty were born out of wedlock. Five were not born in California, and hence could not have been protected by our prenatal blood test law. Of these five, two were born in Arkansas at home, one in Utah en route to California, one in Mexico City and one in Albuquerque.

Ten mothers gave a history of previous pregnancies resulting in non-luetic children (Table 8):

TABLE 8.

Number of Mothers	Previous-Non-luetic Children
3	1
4	2
1	3
1	4
1	10

Table 8 effectively emphasizes that previous pregnancies do not necessarily protect against the birth of a luetic child and should not influence against the taking of blood tests in each pregnancy.

Five mothers had one normal healthy child following the birth of a luetic child. In these cases adequate anti-luetic treatment was given the mother during her subsequent pregnancy.

In two instances two consecutive congenital luetic children were born to a luetic mother.

Three patients had been previously diagnosed and treated for syphilis, yet this did not prevent the subsequent birth of a luetic child. One patient took treatment originally two years previously, came to California before she was "cured," and failed to resume treatment. Another patient was diagnosed and treated in 1938, four years previously, but had no treatment for the current pregnancy. One patient had five hip treatments in 1941, and although she received follow-up cards, failed to continue treatment. Her luetic child was born September 20, 1942.

These three cases demonstrate the importance of resuming anti-luetic treatment on the expectant mother who has been diagnosed, "acquired syphilis," regardless of the type or amount of therapy previously received.

TABLE 9.—*Amount of Treatment during Pregnancy in Mothers Who Bore a Syphilitic Child*

Case Number	Diagnosis Made	"Arm Treatment"	"Hip Treatment"	Months of Treatment	Baby Born
5	9- 1-43	6 (Mapharsen each .04 gm)	5 (each .15 gm. Bismuth)	5	2- 4-44
9	9- 1-43	7	12	4.5	1-18-44
12	6- 1-43	12	12	3.3	9-10-43
13	12-28-40	3	3	0.3	1- 6-41
23	5- 1-42	0	5	4.5	9-20-42
25	3- 8-42	4 (Arsenicals)	0	2.0	5- 7-42
27	8- 3-41	10 (Arsenicals each .45 gm)	10	5.2	1-10-42
28	10- 1-43	16	0	4.2	2- 8-44

CONCERNING TREATMENT

Table 9 shows the amount of treatment given in pregnancy which failed to prevent congenital syphilis. Apology is made for the absence of more detailed data on dosage, but this information was not obtainable.

Case 5 had five bismuth injections, each .15 gram, and six mapharsen injections each .04 gram just prior to the child's birth. Case 9 had twelve hip and seven arm injections during the fifteen weeks prior to delivery, type of drug and dosage are not known. Case 12 started antiluetic treatment in the middle of June, 1943, taking one arsenical and bismuth injection weekly until the baby's birth on September 10, 1943, three months later. Case 13 received only three arsenical and bismuth injections before delivery. Case 18 started treatment on September 13, 1940, about seven months before delivery. Other than the fact that "regular treatment" was given, nothing further could be elicited from the private doctor. Case 25 had one month of arsenical therapy, dose unknown, before delivery. Case 27 had ten weekly bismuth treatments, followed by ten weekly arsenicals (each .45 gram) up to the time of delivery. Her treatment was started in the fourth month of gestation. Case 28 had sixteen "arm" injections.

TABLE 10.—*Facts Pertaining to the Father*

a. Father diagnosed and under treatment	12
b. Father examined and not diagnosed syphilis	7
c. Father examined, diagnosed but not treated	1
d. Father in Army, treatment status unknown	2
e. Father's whereabout unknown	4
f. Father not examined, reason unknown	4
TOTAL	30 Cases

The information given in Table 11 was obtained, relative to mother and luetic child, of medical care subsequent to the diagnosis of congenital syphilis.

TABLE 11.—*Treatment Status of Mother and Child Subsequent to Birth of Syphilitic Child*

	Mother	Child
a. Still under active treatment	23	18
b. Under medical supervision	4	5
c. Refused treatment	2	..
d. Not under treatment	..	5
e. Died	..	2
f. Unknown	1	..
TOTAL	30	30

Parents were uncoöperative in four of the five instances where the child was not receiving treatment. In the fifth case the mother stated she was going to take the child to a clinic.

SUMMARY

Thirty cases of congenital syphilis subsequent to the passage of the prenatal blood test law in California are presented.

Congenital syphilis is higher among Negroes and Mexicans than among the white population of Los Angeles.

Fifty per cent of these luetic mothers went to a physician before the fourth month of pregnancy, at a time when prompt and adequate treatment presumably could have resulted in a non-luetic child.

Although the majority of mothers had a blood test at the first visit to the doctor, one-third had no such test during pregnancy.

One case had a negative blood test early in pregnancy (third month) and a primary vulval darkfield positive lesion the eighth month.

Two mothers gave birth to two consecutive congenital luetic children.

Five of the mothers continued to receive adequate anti-luetic therapy following delivery. Subsequently, each one became pregnant, and each was delivered of a non-luetic baby.

Some of the mothers were uncoöperative in receiving adequate therapy during pregnancy.

One-third of the mothers had previously given birth to non-luetic children.

Three of the thirty mothers had been previously diagnosed as syphilitic and had had previous treatment, which, however, was inadequate.

CONCLUSIONS

Although this survey is numerically small, it does stimulate the following thoughts:

1. A blood test should be done at the first visit in pregnancy and once again before delivery.
2. Syphilitic women should receive adequate therapy in each pregnancy.
3. A more active follow-up program for the treatment of the luetic parturient is indicated.
4. California falls heir to congenital luetic births among recent arrivals from states which have no prenatal blood test law.
5. Early and adequate prenatal care and willingness of patients to coöperate in the enforcement of the intent of the law will materially reduce the incidence of prenatal syphilis.

116 Temple Street.

REFERENCES

1. Records of the Los Angeles City Health Department.
2. November, 1944, Monthly Report of the Bureau of Venereal Diseases of the California State Health Department.

ARTERIOSCLEROTIC GANGRENE WITH SPECIAL REFERENCE TO AMPUTATIONS BELOW THE KNEE*

WALTER SCOTT, M. D.
Hollywood

THE material forming the basis of this study is taken from a series of 107 cases treated at the Los Angeles County Hospital from January 1, 1942, to July 1, 1944. Gangrene of the dry or wet type was the presenting complication in all instances, and the causative factor was an underlying arteriosclerosis obliterans. Diabetes mellitus was an associated factor in 99 instances, while the remainder were purely of the senile gangrene type. Responsibility in the care of these patients was divided between the Medical and the Orthopedic departments, but our discussion here will be limited to the surgical phases of the problem. Major amputations were performed in 60 limbs as shown in Table 1.

TABLE 1.—*107 Cases of Arteriosclerotic Gangrene, With and Without Diabetes Mellitus.*

Type of Management Received:	No. Cases
1. Medical Régimé (Buerger-Allen Exercises, Physiotherapy, Hot Packs, Paravertebral Blocks, Sulfa Therapy, Heat Cradles, etc.)	22
2. Incision and Drainage	8
3. Toe Amputations	7
4. Supracondylar Amputations, Closed Method	23
5. Supracondylar Amputations Open Method	1
6. Below-the-knee Amputations, Closed Method	34
7. Below-the-knee Amputations, Open Method	2
8. Peripheral Nerve Crushing	1
9. Skin Grafts	2
10. Treatment Refused by Patient	7
TOTAL	107

* From the University of Southern California Medical School, Department of Orthopedic Surgery.